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# QCVIEW Class Reference

User Experience: Windows & Views



2007-05-09



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<b>Inherits from</b>	NSView : NSResponder : NSObject
<b>Conforms to</b>	QCCompositionRenderer NSAnimatablePropertyContainer (NSView) NSCoding (NSResponder) NSObject (NSObject)
<b>Framework</b>	/System/Library/Frameworks/Quartz.framework/Frameworks/QuartzComposer.framework
<b>Availability</b>	Available in Mac OS X v10.4 and later.
<b>Companion guide</b>	Quartz Composer Programming Guide
<b>Declared in</b>	QCVIEW.h
<b>Related sample code</b>	iChatTheater QCCocoaComponent Quartz Composer WWDC 2005 TextEdit TrackBall

## Overview

The `QCVIEW` class is a custom `NSVIEW` class that loads, plays, and controls Quartz Composer compositions. It is an autonomous view that is driven by an internal timer running on the main thread.

The view can be set to render a composition automatically when it is placed onscreen. The view stops rendering when it is placed offscreen. When not rendering, the view is filled with the current erase color. The rendered composition automatically synchronizes to the vertical retrace of the monitor.

When you archive a `QCVIEW` object, it saves the composition that's loaded at the time the view is archived.

If you want to perform custom operations while a composition is rendering such as setting input parameters or drawing OpenGL content, you need to subclass `QCVIEW` and implement the [renderAtTime:arguments:](#) (page 15) method.

## Tasks

### Performing Custom Operations During Rendering

- [renderAtTime:arguments:](#) (page 15)  
Overrides to perform your custom operations prior to or after rendering a frame of a composition.

### Loading a Composition

- [loadCompositionFromFile:](#) (page 13)  
Loads the composition file located at the specified path.
- [loadComposition:](#) (page 12)  
Loads a `QCComposition` object into the view.
- [loadedComposition](#) (page 13)  
Returns the composition loaded in the view.
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Unloads the composition from the view.

### Managing the Erase Color

- [erase](#) (page 10)  
Clears the view using the current erase color.
- [eraseColor](#) (page 11)  
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- [setEraseColor:](#) (page 18)  
Sets the color used to erase the view.

### Setting and Getting Event Masks

- [eventForwardingMask](#) (page 11)  
Retrieves the mask used to filter which types of events are forwarded from the view to the composition during rendering.
- [setEventForwardingMask:](#) (page 18)  
Sets the mask used to filter which types of events are forwarded from the view to the composition during rendering.

### Setting and Getting the Maximum Frame Rate

- [maxRenderingFrameRate](#) (page 13)  
Returns the maximum frame rate for rendering.
- [setMaxRenderingFrameRate:](#) (page 19)  
Sets the maximum rendering frame rate.

## Managing Rendering

- [startRendering](#) (page 21)  
Starts rendering the composition that is in the view.
- [isRendering](#) (page 12)  
Checks whether a composition is rendering in the view.
- [autostartsRendering](#) (page 10)  
Checks whether the view is set to start rendering automatically.
- [setAutostartsRendering:](#) (page 18)  
Sets whether the composition that is in the view starts rendering automatically when the view is put on the screen.
- [stopRendering](#) (page 21)  
Stops rendering the composition that is in the view.
- [pauseRendering](#) (page 15)  
Pauses rendering in the view.
- [isPausedRendering](#) (page 11)  
Returns whether or not the rendering in the view is paused.
- [resumeRendering](#) (page 17)  
Resumes rendering a paused composition.

## Using Interface Builder

- [play:](#) (page 15)  
Plays or pauses a composition in a view.
- [start:](#) (page 20)  
Starts rendering a composition in a view.
- [stop:](#) (page 21)  
Stops rendering a composition in a view.

## Taking Snapshot Images

- [snapshotImage](#) (page 20)  
Returns an `NSImage` object of the current image in the view.
- [createSnapshotImageOfType:](#) (page 10)  
Returns the current image in the view as an image object of the provided image type.

## Working With OpenGL

- [openGLContext](#) (page 14)  
Returns the OpenGL context used by the view.
- [openGLPixelFormat](#) (page 14)  
Returns the OpenGL pixel format used by the view.

## Instance Methods

### autostartsRendering

Checks whether the view is set to start rendering automatically.

- (BOOL)autostartsRendering

#### Return Value

Returns YES if the view is set to start rendering automatically when the view is put on screen.

#### Availability

Available in Mac OS X v10.4 and later.

#### See Also

- [setAutostartsRendering:](#) (page 18)

#### Declared In

QCView.h

### createSnapshotImageOfType:

Returns the current image in the view as an image object of the provided image type.

- (id) createSnapshotImageOfType:(NSString\*)type

#### Parameters

*type*

A string that specifies any of the following image types: NSBitmapImageRep, NSImage, CIImage, CGImage, CVOpenGLBuffer, CVPixelBuffer.

#### Return Value

The snapshot image in the provided image type. You are responsible for releasing this object when you no longer need it.

#### Availability

Available in Mac OS X v10.5 and later.

#### See Also

- [snapshotImage](#) (page 20)

#### Declared In

QCView.h

### erase

Clears the view using the current erase color.

- (void)erase

#### Availability

Available in Mac OS X v10.4 and later.

**See Also**

- [eraseColor](#) (page 11)

**Declared In**

QCVIEW.h

## eraseColor

Retrieves the current color used to erase the view.

- (NSColor \*)eraseColor

**Return Value**

The color object previously set using the [setEraseColor:](#) (page 18) method.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [erase](#) (page 10)

**Declared In**

QCVIEW.h

## eventForwardingMask

Retrieves the mask used to filter which types of events are forwarded from the view to the composition during rendering.

- (NSUInteger)eventForwardingMask

**Return Value**

The event filtering mask.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [setEventForwardingMask:](#) (page 18)

**Declared In**

QCVIEW.h

## isPausedRendering

Returns whether or not the rendering in the view is paused.

- (BOOL) isPausedRendering;

**Return Value**

YES if the rendering is paused; otherwise NO.

**Availability**

Available in Mac OS X v10.5 and later.

**See Also**

- [pauseRendering](#) (page 15)
- [resumeRendering](#) (page 17)

**Declared In**

QCVIEW.h

## isRendering

Checks whether a composition is rendering in the view.

- (BOOL)isRendering

**Return Value**

Returns YES if a composition is rendering in the view; NO otherwise.

**Availability**

Available in Mac OS X v10.5 and later.

**Declared In**

QCVIEW.h

## loadComposition:

Loads a QCCOMPOSITION object into the view.

- (BOOL)loadComposition:(QCCOMPOSITION\*)composition

**Parameters**

*composition*

The QCCOMPOSITION object to load.

**Return Value**

YES if successful; otherwise NO. If unsuccessful, any composition that's already loaded in the view remains loaded.

**Availability**

Available in Mac OS X v10.5 and later.

**See Also**

- [loadCompositionFromFile:](#) (page 13)
- [unloadComposition](#) (page 22)
- [loadedComposition](#) (page 13)

**Declared In**

QCVIEW.h

## loadCompositionFromFile:

Loads the composition file located at the specified path.

```
- (BOOL)loadCompositionFromFile:(NSString *)path
```

### Parameters

*path*

A string that specifies the location of a Quartz Composer composition file.

### Return Value

If unsuccessful, returns NO; any composition that's already loaded in the view remains loaded.

### Availability

Available in Mac OS X v10.4 and later.

### See Also

- [loadComposition:](#) (page 12)
- [unloadComposition](#) (page 22)
- [loadedComposition](#) (page 13)

### Declared In

QCView.h

## loadedComposition

Returns the composition loaded in the view.

```
- (QCComposition*) loadedComposition
```

### Return Value

The composition loaded in the view; otherwise nil.

### Availability

Available in Mac OS X v10.5 and later.

### See Also

- [loadCompositionFromFile:](#) (page 13)
- [loadComposition:](#) (page 12)
- [unloadComposition](#) (page 22)

### Declared In

QCView.h

## maxRenderingFrameRate

Returns the maximum frame rate for rendering.

```
- (float)maxRenderingFrameRate
```

### Return Value

The maximum frame rate for rendering. A value of 0.0 specifies that there is no limit.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [setMaxRenderingFrameRate:](#) (page 19)

**Declared In**

QCView.h

## openGLContext

Returns the OpenGL context used by the view.

- (NSOpenGLContext\*) openGLContext

**Return Value**

An NSOpenGLContext object.

**Discussion**

This context as a read-only object . Do not attempt to change any of its settings. If you subclass `QCView` so that you can perform custom OpenGL drawing, you'll need to use this method to retrieve the view's OpenGL context.

**Availability**

Available in Mac OS X v10.5 and later.

**See Also**

- [renderAtTime:arguments:](#) (page 15)

**Declared In**

QCView.h

## openGLPixelFormat

Returns the OpenGL pixel format used by the view.

- (NSOpenGLPixelFormat\*) openGLPixelFormat

**Return Value**

An NSOpenGLPixelFormat object.

**Discussion**

This pixel format as a read-only object. Do not attempt to change any of its settings.

**Availability**

Available in Mac OS X v10.5 and later.

**Declared In**

QCView.h

## pauseRendering

Pauses rendering in the view.

- (void) pauseRendering

### Discussion

You can nest calls to this method.

### Availability

Available in Mac OS X v10.5 and later.

### See Also

- [resumeRendering](#) (page 17)
- [isPausedRendering](#) (page 11)

### Declared In

QCView.h

## play:

Plays or pauses a composition in a view.

- (IBAction) play:(id)sender

### Parameters

*sender*

The object (such as a button or menu item) sending the message to play the composition. You need to connect the object in the interface to the action.

### Return Value

The message sent to the target.

### Discussion

This method starts rendering a composition if it is not already rendering, pauses a composition that is rendering, or resumes rendering for a composition whose rendering is paused. The method is invoked when the user clicks a button or issues a command from some other user interface element, such as a menu.

### Availability

Available in Mac OS X v10.5 and later.

### See Also

- [stop:](#) (page 21)

### Declared In

QCView.h

## renderAtTime:arguments:

Overrides to perform your custom operations prior to or after rendering a frame of a composition.

- (BOOL) renderAtTime:(NSTimeInterval)time arguments:(NSDictionary\*)arguments

**Parameters***time*

The rendering time, in seconds, of the composition frame.

*arguments*

An optional dictionary that can contain `QCRendererEventKey` or `QCRendererMouseLocationKey` and the associated values. (See *QCRenderer Class Reference* or more information.)

**Return Value**

NO if your custom rendering fails, otherwise, YES.

**Discussion**

Do not call this method directly. You override this method only for subclasses of the `QCView` class and only if you want to perform custom operations or OpenGL rendering before and/or after Quartz Composer renders a frame of the composition.

The most common reasons to override this method are to:

- synchronize communication with the composition. For example, you might want to set input parameters of the composition. By overriding this method, you can set parameters only when necessary and only at a specific time.
- underlay or overlay custom OpenGL rendering.

To synchronize communication between a composition and another part of the application, the implementation looks similar to the following:

```
- (BOOL) renderAtTime:(NSTimeInterval)time
    arguments:(NSDictionary*)arguments
{
    // Your code to computer the value of myParameterValue
    [self setValue:myParameterValue forKey:@"myInput"];

    BOOL success = [super renderAtTime:time arguments:arguments];

    id result = [self valueForKey:@"myOutput"];
    //Your code to perform some operation on the result

    return success;
}
```

To perform OpenGL drawing in a `QCView` object, follow these guidelines:

- Use the OpenGL context of the `QCView` object to do drawing. You can retrieve the OpenGL context by calling `[self openGLContext]`. Note that this context won't necessarily be set as the current OpenGL context.
- Use CGL macros instead of managing the current OpenGL context yourself.

 

OpenGL performs a global context and renderer lookup for each command it executes to ensure that all OpenGL commands are issued to the correct rendering context and renderer. There is significant overhead associated with these lookups that can measurably affect performance. CGL macros let you provide a local context variable and cache the current renderer in that variable. They are simple to use, taking only a few lines of code to set up.

- Save and restore all state changes except the ones that are part of `GL_CURRENT_BIT` (RGBA color, color index, normal vector, texture coordinates, and so forth).
- Check for OpenGL errors with `glGetError`.

Here's an example implementation of this method using OpenGL to draw an overlay:

```
#import <OpenGL/CGLMacro.h> // Set up using macros

- (BOOL) renderAtTime:(NSTimeInterval)time
    arguments:(NSDictionary*)arguments
{
    BOOL success = [super renderAtTime:time arguments:arguments];

    // Use the OpenGL context of the view for drawing.
    CGLContextObj cgl_ctx = [[self openGLContext] CGLContextObj];

    // Save and set OpenGL states appropriately.
    glGetIntegerv(GL_MATRIX_MODE, &saveMode);
    glMatrixMode(GL_MODELVIEW);
    glPushMatrix();
    glRotatef(45.0, 0.0, 0.0, 1.0);

    // The code that performs OpenGL drawing goes here.
    //After drawing, restore original OpenGL states.
    glPopMatrix();
    glMatrixMode(saveMode);

    // Check for errors.
    glGetError();
    return success;
}
```

#### Availability

Available in Mac OS X v10.5 and later.

#### Declared In

QCView.h

## resumeRendering

Resumes rendering a paused composition.

```
- (void) resumeRendering
```

#### Discussion

You can nest calls to this method.

#### Availability

Available in Mac OS X v10.5 and later.

#### See Also

- [pauseRendering](#) (page 15)
- [isPausedRendering](#) (page 11)

**Declared In**

QCVIEW.h

**setAutostartsRendering:**

Sets whether the composition that is in the view starts rendering automatically when the view is put on the screen.

```
- (void)setAutostartsRendering:(BOOL)flag
```

**Parameters***flag*

Pass YES to enable autostart mode; NO otherwise.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [autostartsRendering](#) (page 10)

**Declared In**

QCVIEW.h

**setEraseColor:**

Sets the color used to erase the view.

```
- (void)setEraseColor:(NSColor *)color
```

**Parameters***color*

A color object.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [erase](#) (page 10)

- [eraseColor](#) (page 11)

**Declared In**

QCVIEW.h

**setEventForwardingMask:**

Sets the mask used to filter which types of events are forwarded from the view to the composition during rendering.

```
- (void)setEventForwardingMask:(NSUInteger)mask
```

**Parameters**

*mask*

An event filtering mask. The mask can be a combination of any of the mask constants listed in Table 1 or the constant `NSAnyEventMask`.

**Table 1** Events that can be forwarded to a composition

Event	Description
<code>NSLeftMouseDownMask</code>	The user pressed the left button.
<code>NSLeftMouseDraggedMask</code>	The user moved the mouse with the left button down.
<code>NSLeftMouseUpMask</code>	The user released the left button.
<code>NSRightMouseDownMask</code>	The user pressed the right button.
<code>NSRightMouseDraggedMask</code>	The user moved the mouse with the right button down.
<code>NSRightMouseUpMask</code>	The user released the right button.
<code>NSOtherMouseDownMask</code>	The user pressed the middle button, or some button other than the left or right button.
<code>NSOtherMouseDraggedMask</code>	The user moved the mouse with the middle button down, or some button other than the left or right button.
<code>NSOtherMouseUpMask</code>	The user released the middle button, or some button other than the left or right button.
<code>NSMouseMovedMask</code>	The user moved the mouse without holding down a mouse button.
<code>NSScrollWheelMask</code>	The user moved the mouse scroll wheel.
<code>NSKeyDownMask</code>	The user generated a character or characters by pressing a key.
<code>NSKeyUpMask</code>	The user released a key.
<code>NSFlagsChangedMask</code>	The user pressed or released a modifier key, or toggled the Caps Lock key.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [eventForwardingMask](#) (page 11)

**Declared In**

QCView.h

**setMaxRenderingFrameRate:**

Sets the maximum rendering frame rate.

- (void)setMaxRenderingFrameRate:(float)maxFPS

**Parameters**

*maxFPS*

The frame rate to set. Pass 0.0 to specify that there is no limit.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [maxRenderingFrameRate](#) (page 13)

**Declared In**

QCVIEW.h

**snapshotImage**

Returns an NSImage object of the current image in the view.

- (NSImage\*) snapshotImage

**Return Value**

The snapshot image.

**Availability**

Available in Mac OS X v10.5 and later.

**See Also**

- [createSnapshotImageOfType:](#) (page 10)

**Declared In**

QCVIEW.h

**start:**

Starts rendering a composition in a view.

- (IBAction)start:(id) sender

**Parameters**

*sender*

The object (such as a button or menu item) sending the message to start rendering. You need to connect the object in the interface to the action.

**Return Value**

The message sent to the target.

**Discussion**

The method is invoked when the user clicks a button or issues a command from some other user interface element, such as a menu. It is equivalent to the [startRendering](#) (page 21) method.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [stop:](#) (page 21)

**Declared In**

QCView.h

## startRendering

Starts rendering the composition that is in the view.

- (BOOL)startRendering

**Return Value**

Returns NO if the composition fails to start rendering; YES otherwise.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [stopRendering](#) (page 21)

**Declared In**

QCView.h

## stop:

Stops rendering a composition in a view.

- (IBAction)stop:(id)sender

**Parameters**

*sender*

The object (such as a button or menu item) sending the message to stop rendering. You need to connect the object in the interface to the action.

**Return Value**

The message sent to the target.

**Discussion**

The method is invoked when the user clicks a button or issues a command from some other user interface element, such as a menu. It is equivalent to the [stopRendering](#) (page 21) method.

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [start:](#) (page 20)

**Declared In**

QCView.h

## stopRendering

Stops rendering the composition that is in the view.

- (void)stopRendering

**Availability**

Available in Mac OS X v10.4 and later.

**See Also**

- [startRendering](#) (page 21)

**Declared In**

QCVIEW.h

## unloadComposition

Unloads the composition from the view.

- (void) unloadComposition;

**Discussion**

If necessary, this method calls [stopRendering](#) (page 21) prior to unloading the composition.

**Availability**

Available in Mac OS X v10.5 and later.

**See Also**

- [loadCompositionFromFile:](#) (page 13)

- [loadComposition:](#) (page 12)

- [loadedComposition](#) (page 13)

**Declared In**

QCVIEW.h

## Notifications

### QCVIEWDidStartRenderingNotification

Posted when the view starts rendering.

**Availability**

Available in Mac OS X v10.4 and later.

**Declared In**

QCVIEW.h

### QCVIEWDidStopRenderingNotification

Posted when the view stops rendering.

**Availability**

Available in Mac OS X v10.4 and later.

**Declared In**

QCVIEW.h

# Document Revision History

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This table describes the changes to *QCVIEW Class Reference*.

Date	Notes
2007-05-09	Added links and improved class metadata.
	Added <a href="#">loadComposition</a> : (page 12), <a href="#">loadedComposition</a> (page 13), <a href="#">unloadComposition</a> (page 22), <a href="#">renderAtTime:arguments:</a> (page 15), <a href="#">pauseRendering</a> (page 15), <a href="#">isPausedRendering</a> (page 11), <a href="#">resumeRendering</a> (page 17), <a href="#">snapshotImage</a> (page 20), <a href="#">createSnapshotImageOfType:</a> (page 10), <a href="#">openGLContext</a> (page 14), <a href="#">openGLPixelFormat</a> (page 14), and <a href="#">play:</a> (page 15).
	Removed <code>setValue:forInputKey:</code> , <code>valueForInputKey:</code> , and <code>valueForOutputKey:</code> . Instead see <i>QCRenderer Class Reference</i> .
2006-05-23	First publication of this content as a separate document.
	Edited content to comply with new guidelines. Added See Also sections and parameter descriptions.

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